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SELF TEACHING IN THE DEVELOPMENT OF SPEECHREADING IN DEAF CHILDREN.

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DESCRIPTORS- *AUTOINSTRUCTIONAL METHODS, *LIPREADING, *DEAF, *TEACHING METHODS, *HARD OF HEARING, AUTOINSTRUCTIONAL AIDS, INSTRUCTIONAL FILMS, SPECIAL EDUCATION, CHILDREN, AURALLY HANDICAPPED,

THE EFFECTIVENESS OF MOTION PICTURE FILMS AS A TEACHING DEVICE IN THE DEVELOPMENT OF LIPREADING SKILLS AND THE USE OF A CARTRIDGE-LOAD, SELF-WINDING EIGHT MILLIMETER PROJECTOR AS A TEACHING TOOL WERE STUDIED. IT WAS HYPOTHESIZED THAT DEAF AND HARD OF HEARING CHILDREN WOULD LEARN PRESCRIBED VOCABULARY MORE QUICKLY BY AUTOINSTRUCTIONAL FILM METHODS THAN BY CONVENTIONAL METHODS. EIGHTY-NINE DEAF OR HARD OF HEARING SUBJECTS, AGES FOUR TO TEN, WERE DIVIDED INTO FOUR AGE GROUPS. DEAF SUBJECTS HAD A MINIMUM HEARING LEVEL OF 65 DECIBELS (AMERICAN STANDARDS ASSOCIATION). HARD OF HEARING SUBJECTS HAD A MAXIMUM HEARING LEVEL OF 64 DECIBELS (AMERICAN STANDARDS ASSOCIATION). SUBJECTS WITHIN EACH AGE GROUP WERE DIVIDED INTO THREE EXPERIMENTAL GROUPS. GROUP ONE WAS TAUGHT BY THE FILMS, GROUP TWO WAS TAUGHT BY THE TEACHER AND THEN PERMITTED PRACTICE WITH THE FILMS. GROUP THREE WAS TAUGHT BY THE TEACHER ONLY. RESULTS SHOWED NO SIGNIFICANT DIFFERENCE BETWEEN THE THREE GROUPS, ALTHOUGH GROUP ONE ACHIEVED THEIR MAXIMUM SCORES IN THE LEAST AMOUNT OF TIME. GOOD LIPREADERS LEARNED WELL UNDER ALL THE CONDITIONS, WHILE POOR LIPREADERS SHOWED LITTLE IMPROVEMENT IN ANY GROUP. THE FILM PROCEDURE COULD BE USED AS A TOOL FOR PRACTICE AND DRILL, ENABLING THE TEACHER TO DEVOTE MORE OF HER ATTENTION TO THE SLOWER PUPIL. REFERENCE LIST HAS 30 ITEMS. (JB)

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Self Teaching in the Development of Speechreading in Deaf Children

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Arthur L. Neyhus Ph.D.

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INTRODUCTION

Educators of the deaf have long felt that the most difficult obstacle to adequate adjustment in those with deafness from early life is their failure to develop sufficient language usage to deal effectively with their environment. Studies continue to demonstrate that those with good verbal communication skills attain a more adequate economic and social adjustment (Lunda, 1959). Because of the unique learning problems of the deaf, specific methods of instructions must be further developed and improved. Recent studies (Gaeth, 1964) have indicated that deaf children learn best through the visual input. It is through this input that the deaf child must learn the language of his culture.

Prior to meaningful use of the spoken word, a receptive language vocabulary must be developed. The most versatil receptive language system is the one through which the deaf learn that meaning can be attached to movements of the lips. This is speechreading, a visual symbolic rendering of spoken verbal language; a tool which the deaf child can use to integrate his world symbolically and to develop a strong reservoir of receptive language. Investigation has revealed a positive correlation between speechreading, read and written language, and the ability to communicate orally (Myklebust, 1960). Ability to speechread then is of the utmost concern to the classroom teacher of the deaf.

One of the difficulties in developing speechreading in younger children is the exclusive attention that the teacher must devote to a single pupil if maximum results are to be obtained. Even though the number of pupils in each classroom is small, the teacher is limited in the time she can devote to an individual pupil; there is need for techniques which will permit the child to engage in drill and practice without the teacher's constant presence.

The use of motion picture films might be a solution. Such films have been an integral part of the educational system but its use in speechreading instruction has been limited by the cost of equipment, the lack of suitable materials, and the difficulties of using the equipment in the classroom. However, the development of the self-winding, cartridge-lead, rear screen projector has made it possible for children as young as three and four to operate instruments under normal light conditions. For maximum benefit to be derived from such equipment it is necessary to develop practice and training films designed for specific age levels. The focus of the present research was to explore use of films as a teaching device in development of speechreading skills and use of a cartridge-lead, self-winding projector as a teaching machine.

Scientific study of speechreading has been concerned mainly with the analytical aspects of the process. Much attention has been given to the variables which may distinguish good lipreaders from those who have difficulty in developing this skill: intelligence, language levels, perceptual skills, personality or emotional patterns. Study also has been made of factors influencing the message on the lips, such as the linguistic content of the material being presented, the use of facial clues, the visibility or lack of visibility of the speech sound on the lips and the distance between the reader and the speaker. Widespread use of speechreading as a communication tool for the deaf did not appear in this country until the latter part of the last century. Since that time a number of authorities have suggested approaches for teaching lipreading. Although claims have been advanced for the superiority of one method over another, scientific study has not substantiated these claims.

Pertinent research concerning these experimental studies has been summarized by O'Neill (1961) and by Lowell (1957). The relationship of intelligence to speechreading skills was explored by Kitson (1951) and Pintner (1929), Heider (1940), Cavender (1949), and O'Neill (1951). The general conclusion was that there was no significant relationship between overall intelligence and lipreading. Costello (1957) suggested, however, that certain aspects of mental functioning, such as those measured by the Knox Cube Test and the Picture Arrangement Subtest of the Wechsler Intelligence Scale for Children, are related to speechreading ability.

Further studies by O'Neill (1951), Worthington (1956), and Wong (1958), have indicated no relationship between speechreading and personality patterns. Myklebust (1964) did note a relationship between findings on the Minnesota Multiphasic Personality Inventory and speechreading ability and suggests that in the adult, acquiring proficiency in speechreading will be impeded by undue emotional conflict whereas emotional stability will enhance such learning. On the other hand, Kitson (1951) and O'Neill and Davidson (1956) as well as Simmons (1959) have suggested a positive relationship between lipreading and perceptual skills such as memory span, social consciousness, and imagery types.

The complexity of the message was studied by Morris (1944) who demonstrated a decline in lipreading scores as length of sentences increased. Taafe and Wong (1957) observed that performance was affected by the number of words in a sentence, the number of syllables in a sentence as well as the number of vowels and consonants used. Woodward (1957) observed that because of the similar appearance of various consonants the speechreader must distinguish them by their grammatical and lexical redundancy rather than by observation of lip movements alone.

O'Neill (1951) and Stone (1957) suggested that it is the general appearance of the speaker as he phonates rather than only the lip movements that carry the most information.

The use of film as a method of teaching speechreading is a recent innovation; previously motion picture films were employed mainly as a method of testing lipreading ability. Mason (1932) was one of the first to develop a series of training films to be used primarily with adults; Markovin and Moore (1948) constructed films to provide opportunities for students to lipread persons in a variety of situations. Recent improvements in audio-visual aid equipment have suggested new approaches. Forsdale (1963) reported the development of the single-concept film, employing the simple eight millimeter, cartridge-lead, self-winding projector. Stepp (1965) demonstrated that such a projector could be used with sound in teaching speechreading to hard of hearing children. That the deaf can employ self operating machines for learning has been demonstrated by Gaeth (1964) and by Birch and Stuckless (1962).

The present research project entailed an experiment to ascertain the efficiency of a new approach to the teaching of speechreading. The basic feature of the project was a motion picture film designed in accordance with research findings, specifically for developing a lipreading vocabulary. The objective was to provide a series of graded lessons and practice materials to be presented through cartridge-lead projectors. The purpose of the project was to experimentally demonstrate the efficacy of approach which combined the advantages of the use of motion picture film material with the intrinsic values of the teaching machine. The objectives were two fold: (1) the acceleration of the development of lipreading skills; (2) to demonstrate that through this method the teacher could be freed from personally conducting drill sessions, allowing her to engage in more creative activities and more personal service to the individual child. An overall objective was the general improvement of language skills in the deaf child.

The hypothesis was that deaf and hard of hearing school children would learn a prescribed speechreading vocabulary more quickly when employing the self-instruction film method than when taught by a more conventional method. Data were sought relative to the following questions: (1) Is there a method of teaching speechreading which is superior to others? (2) Do those who learn through a teaching machine not only learn more quickly but retain better what they have learned? (3) Do etiology, socioeconomic status, intelligence, language levels, or hearing levels influence the learning of speechreading?

METHOD

The Sample

The sample consisted of 87 children chosen from the hearing impaired classes of the Alexander Graham Bell School in Chicago, which in addition to offering a typical public school curriculum for the children in its immediate neighborhood also serves the hard of hearing and the deaf of the north side of the city. Over 100 children were originally screened but a number were not included in the study as they failed to meet one of more of the following criteria: a level of intellectual functioning that fell within normal limits (a learning quotient of 80 as measured by the Nebraska Test of Learning Aptitude (Hiskey, 1955) or a Performance Quotient of 80 on the Wechsler Intelligence Scale for children); a minimum hearing level for the deaf of 65 decibels (ASA) or a maximum level of 64 decibels (ASA) for the hard of hearing in the better ear for the speech frequencies 500 to 2000 HZ.; and a negative history of emotional or learning disorders. Of the 87 children chosen for the study 58 were males and 29 female. It was originally intended to employ 24 subjects at each of four age levels equally divided as to sex, and hearing levels. All of the children enrolled in the age range four to ten years were screened; however, it was not possible to fill all the groups. For example, in the Chicago program few children classified as hard of hearing are enrolled in the nursery age group (none were present at Bell school) and only a limited number were available at the other age levels. The group ultimately chosen for study represented the total number of pupils meeting the study criteria, and who were available during the period of the experiment so that valid measures could be obtained.

The subjects were divided into four age levels: nursery, three and four years; kindergarten, five and six years; primary, seven and eight years; and intermediate, nine and ten years. The age groupings were similar to those for whom the training films were designed. Table 1 depicts this distribution by age and sex. It will be noted that the median chronological age generally fell at the mid-point of the grouping. (Throughout the study, because of the small groups of subjects employed and the experimental nature of the program non-parametric statistics were used.)

Procedures

The material to be learned and the drill and practice material were presented on film through a cartridge-load, self-winding, eight millimeter projector. Two types of projectors were employed: the Fairchild Mark IV, a sound projector was used with the hard of hearing children and the Technicolor 800, a silent projector with the deaf. The instructional material consisted

TABLE 1.

DISTRIBUTION OF SUBJECTS BY AGE

Group	N	Median Yrs. Mos.	Range Yrs. Mos.
Nursery			
Males	8	4-2	3-9 to 4-11
Females	3	4-6	3-9 to 4-11
Total	11	4-3	3-9 to 4-11
Kindergarten			
Males	14	6-3	5-1 to 6-3
Females	10	5-11	5-1 to 6-4
Total	24	6-0	5-1 to 6-4
Primary Deaf			
Males	14	7-10	6-9 to 8-10
Females	5	8-8	7-9 to 8-10
Total	19	7-10	6-9 to 8-10
Primary Hard Of Hearing			
Males	2	8-0	7-5 to 8-0
Females	3	8-6	7-9 to 8-11
Total	5	8-3	7-5 to 8-11
Intermediate Deaf			
Males	9	9-6	9-0 to 12-8
Females	2	10-5	9-11 to 10-10
Total	11	9-9	9-0 to 12-8
Intermediate Hard of Hearing			
Males	10	10-1	9-4 to 11-7
Females	7	10-10	8-9 to 12-9
Total	17	10-6	8-9 to 12-9

of a series of films designed to teach a specific speechreading vocabulary. Four films of approximately five minutes running time were produced, each adapted for a specific age level corresponding to the groupings established. The film for the Nursery group contained 13 words; Level II, for the Kindergarten subjects had 17 words; Level III, designed for the Primary children also employed 17 words, while Level IV comprised 19 words. The words chosen for filming were representative of those appropriate for the particular age level.

For the nursery level the vocabulary consisted mainly of nouns and verbs closely related to the young child's immediate experience, such as parts of the body, family relationships, and action verbs. For the older children it was possible to obtain a list more closely related to the child's age and language usage.

As part of a national study on written language, The Picture Story Language Test (Myklebust, 1965) was administered to over 800 deaf children and 700 normally hearing. From this larger group, 400 stories were selected - 200 deaf and 200 normally hearing - at the age levels of seven, nine, eleven, thirteen and fifteen years. Every word written and its frequency of usage was determined making it possible to obtain a list of words known to both deaf and hearing children at each age level. This written vocabulary became the basis of the word pool to be illustrated in the speechreading film. In making the selection for the film for a specific age level, consideration was also given to the ease with which the word could be read on the lips, its appropriateness for the age level, and how well it could be depicted in the film.

The proportion of the parts of speech illustrated was similar to that observed in the written product. Each of the films followed a similar pattern; a scene depicted two characters, a teacher and a child, in an informal classroom setting. Teacher and child would engage in general conversation with appropriate actions; woven into the dialogue were the vocabulary words. As each key word was employed it was given special emphasis through closeups and repetitions. Each of the films lasted five minutes; for the experimental situations two and one-half minutes were presented at a time. These filme were produced in color and in sound in cooperation with the Department of Radio, Television, and Film of the School of Speech of Northwestern University which supplied the technical staff for direction and filming.

The films as completed provided a series of lessons and practice materials for learning to speechread on a developmental basis. The films were presented through two types of projectors. For the hard of hearing the presentation was through the Fairchild Mark IV Cinephonic Projector. For those who could not

benefit from sound the Technicolor 800 Instant Movie projector without sound was employed. Previous clinical experience had indicated that children as young as three could operate the projectors including the insertion of the plastic cartridge containing the film. The purpose of having the two projectors was to test the value of the less expensive silent projector for those who could not benefit from sound.

The experimental procedures were as follows: in condition I the group employed the film techniques only. The group as a whole viewed the film in its entirety with the instructor emphasizing the key words and indicating that they were to be learned. The child was then presented with his own projector, instructed in its use and permitted to view the film on his own. The sessions lasted from 15 to 30 minutes; a record was kept of the amount of time the subject spent with the instrument. Following the practice sessions a filmed lipreading test based on the vocabulary words was administered; these practice sessions were repeated until the subject indicated by his scores on the speechreading test that he had learned the vocabulary.

Experimental condition II included the teacher and the procedures. A teacher from the regular faculty of the school introduced the vocabulary using the techniques that would generally be employed with the particular age level. Four teachers were selected from those of the staff who had volunteered their services for the project. Those selected were chosen on the basis of experience and familiarity with a particular group. The amount of time spent by the teacher with the group was left to her discretion, however a record was kept of the period devoted to teaching. Following the formal teaching session the second group was given a period of practice and drill with the films and the projectors. After the practice period the lipreading test was given to determine how many words had been learned.

The third condition employed the control group. This group was taught by a teacher who used the procedures she regularly employed in the classroom. In order to equate the teaching in the second experimental group and the control group the same instructor was used.

At each age level the three groups were equated for age, sex, socio-economic status, hearing levels, intelligence, and communication and language skills.

From the school records the following information was obtained for each subject: birth date, hearing level, parents' occupation, age of onset of the hearing loss, etiology (for those classified as familial the presence of other deaf relatives was noted), the number of years of training, and the presence or absence of emotional and/or learning problems. Those who met the study

criteria were then seen for additional testing.

The Wechsler Intelligence Scale for Children (WISC) Performance section was administered to the subjects in the Kindergarten, Primary, and Intermediate groups; as the WISC did not have normative data below five years of age, the Nebraska Test of Learning Aptitude (1955) served as a measure of intellectual functioning for the nursery group. The Gates Primary Reading Tests, Paragraph Reading and Word Recognition, were used to sample read language while the Picture Story Language Test (Myklebust, 1965) gave information on the subject's ability with written language. Teacher ratings of speech and speechreading were obtained to equate the groups in relation to their communication skills; in addition, before the introduction of the learning tasks, the filmed test of the vocabulary was given to each child, the results being used as an additional aid in placing the subject in the experimental group. Hearing levels were ascertained by formal audiometric procedures employing a Beltone 9A audiometer. (Hearing levels in this report refer to ASA standards.)

A summary of the data concerning socio-economic status is presented in Table 2. It was observed that the largest number of parents' occupations fell in the skilled manual category representing 32.2 per cent of the sample; 65, or 75.8 per cent of the parents had occupations placing them in the working class sector of the population. Only 22 or 24.2 per cent of the subjects were drawn from what would be the technical and professional occupations. It would appear that the subjects in the study were drawn more from those represented in the unskilled and skilled laboring classes than would be found in the general population; however, in terms of socio-economic status the sample is representative of the area from which the Bell school drew its pupils.

As noted in Table 3, the majority of the children (79 or 90.8 per cent) lost their hearing at birth of before their first birthday. The highest etiology, Table 4, was familial deafness, representing 17 or 19.5 per cent of the subjects; an equal number of unknown causes was noted. The incidence of perinatal complications - birth injury, birth anoxia, prematurity - was high, representing 24 or 27.5 per cent of the group. Maternal illnesses such as Rubella during the first trimester of pregnancy accounted for 12 or 13.8 per cent while 7 or 8.1 per cent were born deaf as a result of Rh incompatability. Meningitis and childhood diseases formerly a large contributor to hearing loss in children were found to be a minor factor. The distribution of hearing levels for both the deaf and hard of hearing is shown in Tables 5, 6, 7, and 8. Two-thirds of the subjects or 66.2 per cent had a hearing loss beyond the limits of the audiometer; 48 or 73.8 per cent were classified as having profound deafness. The median hearing level for the hard of hearing was 54.3 decibels, considered a moderate loss.

TABLE 2.

RATINGS OF PARENTS' OCCUPATIONS

Grade - Type of Occupation	Fathers of Male Subjects		Fathers of Female Subjects		Total	
	N	%	N	%	N	%
I Unskilled Manual	8	14.1	0	-	8	9.2
II Semi-Skilled	16	28.1	9	30.0	25	28.7
III-A Skilled Manual	18	31.6	10	33.3	28	32.2
III-B Skilled Clerical	3	5.4	1	3.3	4	4.6
IV-A Sub-Professional	0	-	0	-	0	-
IV-B Proprietor	7	5.3	4	13.3	11	12.6
IV-C Supervisory	1	1.8	1	3.3	2	2.3
V-A Professional Linguistic	1	1.8	0	-	1	1.1
V-B Professional Scientific	2	3.5	2	6.7	4	4.6
V-C Executive	1	1.8	3	10.0	4	4.6

TABLE 3.

THE AGE OF ONSET OF THE HEARING LOSS

Age of Onset	Males		Females		Total	
	N	%	N	%	N	%
Nursery						
Birth	8	100.0	3	100.0	11	100.0
One Year	0	-	0	-	0	-
Kindergarten						
Birth	12	85.7	8	80.0	20	83.4
One Year	0	-	2	20.0	2	8.3
Two Years	2	11.3	0	-	2	8.3
Primary						
Birth	15	93.8	8	100.0	23	95.8
One Year	0	-	0	-	0	-
Two Years	1	6.2	0	-	1	4.2
Intermediate						
Birth	16	84.2	9	100.0	25	89.3
One Year	2	10.5	0	-	2	7.4
Two Years	0	-	0	-	0	-
Three Years	1	4.2	0	-	1	3.7
Total						
Birth	51	89.5	28	93.3	79	90.8
One Year	2	3.5	2	6.7	4	4.6
Two Years	3	5.3	0	-	3	3.4
Three Years	1	1.8	0	-	1	1.1

TABLE 4.

ETIOLOGY OF THE HEARING LOSS

Etiology	Male		Female		Total	
	N	%	N	%	N	%
Familial	11	19.3	6	20.0	17	19.5
Maternal Rubella	6	10.5	2	6.7	8	9.2
Maternal Illness	3	5.3	1	3.3	4	4.6
Birth Injury	8	14.0	3	10.0	11	12.6
Prematurity	6	10.5	3	10.0	9	10.3
Birth Anoxia	2	3.5	2	6.7	4	4.6
Rh Incompatibility	3	5.3	4	13.3	7	8.6
Childhood Diseases	4	7.0			4	4.6
Viral Infections	2	3.5	1	3.3	3	3.4
Otitis Media	1	1.8			1	1.1
Birth Anomalies	1	1.8			1	1.1
Meningitis	1	1.8			1	1.1
Unknown	9	15.2	8	26.7	17	19.5
Total	57	100.0	30	100.0	87	100.2

TABLE 5.

EXTENT OF HEARING LOSS - DEAF SUBJECTS

Extent of Loss	Males (N=45)		Females (N=20)		Total (N=65)	
	N	%	N	%	N	%
Nursery						
Moderate to Severe			2	66.7	2	18.2
Severe						
Severe to Profound	5	62.5	1	33.3	6	54.6
Profound	3	37.5			3	27.2
Kindergarten						
Moderate to Severe			1	10.0	1	4.2
Severe	1	7.1	1	10.0	2	8.4
Severe to Profound	1	7.1	2	20.0	3	12.4
Profound	12	85.8	6	60.0	18	75.0
Primary						
Moderate to Severe	4	28.5			4	21.1
Severe	3	21.4	3	60.0	6	31.6
Severe to Profound	3	21.4			3	15.7
Profound	5	55.6	1	50.0	6	54.6
Total						
Moderate to Severe	4	8.9	3	15.0	7	10.8
Severe	7	15.6	4	20.0	11	16.9
Severe to Profound	10	22.2	4	20.0	14	21.5
Profound	24	53.3	9	45.0	33	50.8

TABLE 6.

EXTENT OF HEARING LOSS - HARD OF HEARING SUBJECTS

Extent of Loss	Males (N=12)		Females (N=10)		Total (N=22)	
	N	%	N	%	N	%
Moderate	5	41.7	2	20.0	7	31.8
Moderate to Severe	7	58.3	8	80.0	15	68.2

TABLE 7.

AVERAGE HEARING LEVEL FOR DEAF SUBJECTS - BETTER EAR
AVERAGE FOR FREQUENCIES 500 - 2000 Hz.

Decibels (ASA)	Males		Females		Total	
	N	%	N	%	N	%
101+	28	62.3	15	75.0	43	66.2
96 - 100						
91 - 95	3	6.7			3	4.3
86 - 90	2	4.4			2	3.1
81 - 85	4	8.9	3	15.0	7	10.1
76 - 80	2	4.4			2	3.1
71 - 75	2	4.4	2	10.0	4	6.2
66 - 70	4	8.9			4	6.2
Total	45	100.0	20	100.0	65	100.0

TABLE 8.

AVERAGE HEARING LEVEL FOR HARD OF HEARING SUBJECTS - BETTER EAR AVERAGE FOR FREQUENCIES 500 - 2000 Hz.

Decibels (ASA)	Males		Females		Total	
	N	%	N	%	N	%
61 - 65	1	8.3	3	30.0	4	18.0
56 - 60	4	33.4	2	20.0	6	27.3
51 - 55	2	16.7	1	10.0	3	13.6
46 - 50			2	20.0	2	9.0
41 - 45	1	8.3			1	4.5
36 - 40	2	16.7	2	20.0	4	18.1
31 - 35	1	8.3			1	4.5
26 - 30	1	8.3			1	4.5
Total	12	100.0	10	100.0	22	100.0

The sample selected for the study appears representative of both the deaf and hard of hearing in terms of socio-economic status, age of onset, and extent of the hearing loss.

THE RESULTS

Although research has suggested little significant relationship between intelligence and speechreading ability, such measures were felt to be necessary to ensure that the various experimental groups would be equated in relationship to intellectual functioning. The results of the Wechsler Intelligence Scale for Children are presented in Tables 9 and 10.

The Median Learning Quotient for the Nursery Males was 111 (Range, 91 to 147); for the Females it was 127 (Range, 106 to 134.) There was no significant difference between the groups (Fisher Exact Probability Test p. 10, Siegel, 1956); the median for the total group was 120.

For the kindergarten the Male Deaf had a Performance IQ of 95 (Range, 80 to 125) and the Females 106 (Range, 82 to 118). The median for the total group was 103. The Median Performance Quotient for the Primary Deaf was 99 (Range, 82 to 125) and the Intermediate Deaf was 97 (Range, 86 to 125). For the Deaf Subjects as a whole (N = 54), the median Performance IQ was 97 (Range, 80 to 132); the Males and the Females obtained similar scores. No significant differences were noted between sexes nor among the age groups. The Median IQ for the Hard of Hearing (N = 22) was 104 (Range, 82 to 132); median IQ for Males was 105, for the Females 97.5. As with the Deaf, no significant differences were observed between the sexes, among the age groups, nor between the Deaf and the Hard of Hearing. The results are essentially similar to those obtained by previous investigators (Brill, 1962) (McKay, 1966).

The Goodenough - Harris drawing of a man and a woman were obtained from all of the subjects. The authors state that the hypothesis underlying the test is that, "the child's drawing of any object will reveal the discrimination he has made about that object as belonging to a class, i.e. a concept. In particular, it is hypothesized that his concept of a frequently experienced object, such as a human being, becomes a useful index to the growing complexity of his concepts generally." The authors also have felt that this test is a measure of the child's visual perceptual abilities (Harris, 1965).

The test was administered to all subjects and the results by age groups are found in Tables 11 and 12. For the Deaf the Median Standard Score for the Man Drawing was 103 (Range, 62 to 152). The Median Score for the Nursery group was 91 compared to

TABLE 9.

MEDIAN INTELLIGENCE QUOTIENTS OBTAINED FROM DEAF SUBJECTS ON PERFORMANCE SECTION OF WISC

Group	N	Median IQ	Range
Kindergarten			
Males	14	95.0	80 to 125
Females	10	106.0	82 to 118
Total	24	103.0	80 to 125
Primary			
Males	14	100.5	82 to 115
Females	5	96.0	83 to 125
Total	19	99.0	82 to 125
Intermediate			
Males	9	96.0	86 to 117
Females	2	109.0	92 to 125
Total	11	97.0	86 to 125
Total			
Males	37	97.0	80 to 125
Females	17	97.0	80 to 125
Total	54	97.0	80 to 125

TABLE 10.

MEDIAN INTELLIGENCE QUOTIENTS OBTAINED FROM HARD OF HEARING SUBJECTS ON PERFORMANCE SECTION OF WISC

Group	N	Median IQ	Range
Primary			
Males	2	122.0	110 to 132
Females	3	96.0	87 to 111
Total	5	106.0	87 to 132
Intermediate			
Males	10	105.0	94 to 122
Females	7	99.0	82 to 111
Total	17	104.0	82 to 122
Total			
Males	12	105.0	94 to 132
Females	10	97.5	82 to 111
Total	22	104.0	82 to 132

TABLE 11

RESULTS OF GOODENOUGH - HARRIS DRAWING TESTS -DEAF SUBJECTS

Group	N	Man		Woman	
		Median Std. Score	Range	Median Std. Score	Range
Nursery					
Males	8	89.0	62 to 126	77.5	65 to 122
Females	3	92.0	89 to 113	78.0	78 to 83
Total	11	91.0	62 to 126	78.0	68 to 122
Kindergarten					
Males	14	99.5	89 to 152	108.0	89 to 139
Females	10	110.0	68 to 124	96.0	69 to 126
Total	24	104.5	68 to 152	105.0	69 to 139
Primary					
Males	14	98.5	68 to 143	90.0	70 to 139
Females	5	110.0	83 to 125	97.0	84 to 108
Total	19	100.0	68 to 125	93.0	70 to 139
Intermediate					
Males	9	107.0	87 to 133	93.0	89 to 123
Females	2	117.5	111 to 124	115.5	102 to 129
Total	11	111.0	87 to 124	95.0	89 to 129
Total					
Males	45	103.0	62 to 152	95.0	68 to 139
Females	20	101.0	68 to 125	95.0	69 to 129
Total	65	103.0	62 to 152	95.0	68 to 139

a score of 103 for the older children. This difference was found to be significant (The Median Test $X^2 = 4.64$, ~~4.05~~). These results suggest that very young deaf children are somewhat in the visual perceptual skills measured by this test; on the other hand the Nursery group's performance on the Hiskey indicates that not all such skills are involved. It may be that the Nebraska test is measuring rather concrete abilities while the Goodenough - Harris taps the abilities necessary for more abstract concept formation (Birch, 1951). Such conclusions, however must be considered tentative.

The Gates Primary Reading Tests were administered to all subjects in the Primary and Intermediate groups. The test was employed as a measure of read language; although the norms for the test include the six year level only three subjects in the kindergarten group achieved a scorable response. The Word Recognition and Paragraph Meaning sub-tests were administered; those of the older groups who achieved close to a perfect score for these tests were also given the Advanced Primary Tests so that a correct measure of their ability was obtained. These results are presented in Tables 13 and 14.

The median grade score for Word Recognition for the Primary children was 2.33. There was no significant difference between the sexes. Based on a median chronological age of seven years and ten months, the expected grade score is 2.6; the Females with a higher chronological age (eight years and eight months) and a grade score of 2.5, are considered more retarded, a full grade. On the test for Paragraph Meaning, a measure of reading comprehension, the primary deaf group demonstrated a grade score of 2.2, a retardation of four months. Again the deaf Females were one grade retarded.

The results for the Intermediate Deaf Group displayed the further difficulty found for deaf children with a profound hearing impairment from early life. The median chronological age for this group was nine years and nine months, a difference of almost two years from the Primary Deaf; however, the median grade score for the group on the test of Word Recognition was 2.8 - a gain of five months in two years. On the test of Paragraph Meaning the score for the Intermediates was grade 2.33; for the Primary Deaf it was 2.2, a gain of approximately one month; the normal expectancy is grade 4.6.

It would appear that the Deaf and Hearing child of seven years may be able to read the same words or perhaps can read the same words on the test as both are beginning to master the reading process; however, the normally hearing child with his vastly superior reservoir of verbal language is able to increase his acquisition of the read word as well as develop his understanding of the material, while the deaf child makes little if any progress. The Hard of Hearing Group, whose median hearing level

TABLE 12

RESULTS OF GOODENOUGH - HARRIS DRAWING TESTS - HARD OF HEARING SUBJECTS

Group	N	Man		Woman	
		Median Std. Score	Range	Median Std. Score	Range
Primary					
Males	2	104.0	97 to 114	98.5	93 to 104
Females	3	116.0	97 to 148	118.0	108 to 138
Total	5	114.0	97 to 148	108.0	93 to 138
Intermediate					
Males	10	110.0	85 to 127	112.5	92 to 127
Females	7	95.0	62 to 122	102.0	89 to 112
Total	17	98.0	62 to 127	102.0	89 to 127
Total					
Males	12	109.5	85 to 127	107.5	92 to 127
Females	10	101.0	62 to 148	104.0	89 to 138
Total	22	104.5	62 to 148	104.5	89 to 138

TABLE 13

RESULTS OF GATES READING TESTS - DEAF SUBJECTS

Group	N	Median C.A. Yrs. Mos.	Word Recognition		Paragraph Meaning	
			Median Grade Score	Expected Grade Score	Median Grade Score	Expected Grade Score
Primary						
Males	14	7 - 10	2.1	2.6	2.1	2.6
Females	5	8 - 8	2.5	3.5	2.4	3.5
Total	19	7 - 10	2.33	2.6	2.2	2.6
Intermediate						
Males	9	9 - 6	2.45	4.3	2.35	4.3
Females	2	10 - 5	2.74	5.2	1.85	5.2
Total	11	9 - 9	2.8	4.6	2.33	4.6

placed them in the moderate category (56.4 db, ASA) displayed a similar picture of retardation; although their chronological age was somewhat higher, there was no significant difference in their reading scores and those for the deaf.

The Picture Story Language Test was given to the Primary and Intermediate Groups. It has been described as a test of written expressive language. Comparison was made with the normally hearing and with the hearing impaired (Myklebust, 1964, 1965). These results are presented in Tables 15 and 16. The Primary Group was observed to fall at the twenty-fifth percentile of the normally hearing for productivity as measured by the Words per Sentence Score; at the tenth percentile for Syntax, but at the fifty-fifth percentile in terms of the Abstractness of thought, as measured by the Abstract-Concrete score. The scores were below those reported by Myklebust for the seven year old in productivity but above average in Syntax and Abstractness.

The older group, the Intermediates were found comparable to the nine year old Deaf Group on whom the norms were established, but their median Words per Sentence Score was at the Second percentile for the hearing, the Syntax score at the fifth percentile, and at the eighteenth percentile for Abstract-Concrete. Again the older deaf groups in the project displayed the retardation in read and written language that has been reported consistently by investigators in the psychology of deafness.

Experimental Results

The Nursery Group

Each of the age levels were divided into three experimental groups: Group I represented those who were to learn the speechreading vocabulary through use of the film projector alone; Experimental Group II was to have the teacher and practice time with the film; Experimental Group III was to be taught by the teacher only. Each of the Experimental Groups was matched to the others in terms of sex, age, intellectual ability, speechreading ratings, and the capacity to use read and written language.

The Nursery group had the task of learning 13 words. Table 17 presents the results for this group. No significant differences were noted among the experimental groups in the Learning Quotients derived from the Hiskey, the Standard Score of the Goodenough-Harris Drawing, nor in speechreading abilities as rated by the teacher. The total number of training sessions was essentially similar for each although Group I had one more than the others. The results for the test of the the words given before the experiment revealed no significant differences among the groups (Kruskall-Wallis Analysis of Variance $H = .127$, $p > .10$).

TABLE 14

RESULTS OF GATES READING TESTS - HARD OF HEARING SUBJECTS

Group	N	Median C.A. Yrs. Mos.	Word Recognition Median Grade Score	Word Recognition Expected Grade Score	Paragraph Meaning Median Grade Score	Paragraph Meaning Expected Grade Score
Primary						
Males	2	8 - 0	2.2	2.83	1.90	2.83
Females	3	8 - 6	3.0	3.3	2.6	3.3
Total	5	8 - 3	2.45	3.1	2.3	3.1
Intermediate						
Males	10	10 - 1	3.1	4.9	2.6	4.9
Females	7	10 -10	4.1	5.8	2.83	5.8
Total	17	10 - 6	3.2	5.4	2.7	5.4

TABLE 15

PICTURE STORY LANGUAGE TEST--MEDIAN SCORES FOR DEAF SUBJECTS

	Males(N=13)		Females(N=5)		Total(N=18)	
Primary	Score	Range	Score	Range	Score	Range
Syntax	66.0	42 to 81	64.0	47 to 84	65.0	42 to 84
Total Words	8.0	4 to 41	15.0	7 to 58	9.0	4 to 58
Total Sentences	1.0	1 to 7	3.0	1 to 9	2.0	1 to 9
Words per Sentence	5.0	1 to 10	5.5	2.3to 15	5.0	1 to 15
Abstract/ Concrete	7.0	1 to 14	9.0	1 to 13	7.0	1 to 13
Intermediate	Males(N=8)		Females(N=2)		Total(N=10)	
Syntax	76.0	45 to 96	80.5	78 to 83	78.0	45 to 96
Total Words	25.0	6 to 94	35.5	28 to 43	28.0	6 to 94
Total Sentences	6.5	1 to 15	11.0	8 to 14	9.0	1 to 15
Words per Sentence	5.7	2.2to 6.3	4.4	3.5to 5.3	5.45	2.2to 6.3
Abstract/ Concrete	7.0	2 to 14	13.5	13 to 14	7.5	2 to 14

TABLE 16

PICTURE STORY LANGUAGE TEST - MEDIAN SCORES FOR INTERMEDIATE HARD OF HEARING SUBJECTS

	Males(N=10)		Females(N=7)		Total(N=17)	
	Score	Range	Score	Range	Score	Range
Syntax	63.0	43 - 100	91.0	70 - 98	89.0	43 - 100
Total Words	43.5	8 - 123	98.0	13 - 119	44.0	8 - 123
Total Sentences	6.0	1 - 9	1.0	1 - 13	6.0	1 - 13
Words per Sentence	6.9	1 - 13	10.0	1 - 17	7.3	1 - 17
Abstract/ Concrete	11.5	1 - 21	18.0	7 - 20	12.0	1 - 21

TABLE 17

COMPARISON OF MEDIAN SCORES FOR EXPERIMENTAL GROUPS NURSERY DEAF

Experimental groups	I(N=3)	II(N=4)	III(N=4)
Chronological Age	4yrs.-9mos.	4yrs.-1mo.	4yrs.
Teachers' Ratings of Speechreading	Ave.	Ave.	Ave.
Hiskey Learning Quotient	126.0	115.0	113.0
Standard Score Goodenough-Harris Drawing of Man	100.0	89.0	91.0
No. of Words Known on Speechreading Pre-test	2.0	2.5	2.5
No. of Words Known on Final Speechreading Test	6.0	3.0	2.5
No. of Words Retained	3.0	4.5	2.3

At the completion of the experiment, Group I knew a median of six words; Group II had 5 words; and Group III 2.5 words. Again the differences were not significant (H = .946). Based on teacher's ratings the Nursery Group was reconstituted into Good and Excellent speechreaders, and Average and Poor. No difference was observed in intellectual functioning but each of the subjects in the Good to Excellent category successfully learned the vocabulary regardless of the method employed and in half of the time; in turn those classified as average or poor were significantly inferior (Kruskall-Wallis H = 5.69, significant at the five per cent level). These data are presented in Table 18.

The Kindergarten Group

Although the Experimental Groups, Table 19, were equated for age, intelligence, and speechreading ability, the Kruskall-Wallis Analysis of Variance revealed no significant differences. Group I knew a median of five words at the end of the training sessions, a gain of 2; Group II using teacher and film went from a median of three to nine words, and Group III went from five to eight words. A total of six teaching sessions lasting 15 to 30 minutes was employed. (Group I spent a total of 125 minutes on the film; Group II had 160 minutes with the teacher and 158 minutes with the film; Group III had 177 minutes with the teacher alone.) Group II using the combined approach tended to have higher scores but also were exposed longest to the material.

When the groups were divided according to speechreading ability, Table 20, significant differences were found; no differences in intellectual functioning was observed. However, out of the 30 words in both the Level I and the Level II vocabularies, the Good speechreaders knew 15, the Poor 6.5; on the experimental vocabulary the Good lipreaders knew eight on the pre-test, the Poor knew a median of three; on the final test the better speechreaders knew 12 words compared to a median of four observed in the poorer subjects. These results were significant at the one per cent level (Fisher Exact Probability Test).

The Primary Group

The data for the Primary Group are presented in Table 21. The subjects were taught the 17 words from Level Three; five sessions were employed consisting of a total of 88 minutes for Group I, 150 minutes for Group II, and 115 minutes for Group III. Again no significant differences were noted among the experimental groups in intellectual functioning and in read and written language as well as on speechreading ratings. No differences were observed among the groups in the manner in which they learn the test words. The median number of words known on the pre-test was eight for all three experimental groups; after the learning sessions Groups I and II knew 15 words; Group III had a median score of 15.5. The retest scores were essentially similar. When the subjects were

TABLE 18

NURSERY DEAF - COMPARISON OF MEDIAN SCORES AMONG GOOD, AVERAGE, AND POOR SPEECHREADERS

Groups	Good(N=3)	Ave.(N=4)	Poor(N=4)
Chronological Age	4yrs.-1mo.	4yrs.-5mos.	3yrs.-11mos.
Teachers' Ratings of Speech	Excel.	Ave.	Poor
Hiskey Learning Quotient	131.0	123.0	98.5
Standard Score Good-enough-Harris Drawing of Man	113.0	92.0	81.5
No. of Words Known on Speechreading Pre-test	4.0	1.5	2.0
No. of Words Known on Final Speechreading Test	11.0	3.5	3.0
No. of Words Retained	11.0	3.5	2.0

TABLE 19

COMPARISON OF MEDIAN SCORES FOR EXPERIMENTAL GROUPS KINDERGARTEN DEAF

Experimental Groups	I(N=8)	II(N=9)	III(N=7)
Chronological Age	6yrs.	6yrs.	5yrs.-8mos.
Teachers' Ratings of Speech-reading	Ave.	Ave.	Good
WISC Performance IQ	96.0	98.5	106.0
Standard Score Goodenough Harris Drawing of Man	112.0	92.0	104.0
No. of Words Known on Speechreading Pre-test	3.0	3.0	5.0
No. of Words Known on Final Speechreading Test	5.0	9.0	7.0
No. of Words Retained	3.0	7.0	3.0

TABLE 20

KINDERGARTEN DEAF - COMPARISON OF MEDIAN SCORES BETWEEN GOOD AND POOR SPEECHREADERS

Groups	Good[1] (N=9)	Poor[2] (N=15)
Chronological Age	5yrs.-11mos.	6yrs.
Teachers' Ratings of Speech	Fair	Poor
WISC Performance IQ	114.0	95.5
Standard Score Goodenough - Harris Drawing of Man	105.0	104.0
No. of Words Known on Speechreading Pre-test	8.0	3.0
No. of Words Known on Final Speechreading Test	12.0	4.0
No. of Words Retained	9.0	2.0

1. Includes those classified as Excellent
2. Includes those classified as Fair and Average

TABLE 21

COMPARISON OF MEDIAN SCORES FOR EXPERIMENTAL GROUPS-
PRIMARY DEAF

Experimental Group	I(N=6)	II(N=7)	III(N=6)
Chronological Age	7yrs.-8mos.	7yrs.-11mos.	7yrs.-11mos.
Teachers' Ratings of Speechreading	Good	Good	Good
WISC Performance IQ	100.0	101.0	98.0
Standard Score Goodenough-Harris Drawing of Man	97.0	103.0	102.0
Grade Scores - Gates Reading Tests			
Word Recognition	2.8	2.33	2.1
Paragraph Meaning	2.3	2.20	1.9
Picture Story Language Test			
Syntax	76.0	56.0	66.0
Words Per Sentence	5.0	5.5	2.0
Abstract/Concrete	7.0	7.0	5.5
No. of Words Known on Speechreading Pre-test	8.0	8.0	8.0
No. of Words Known on Final Speechreading Test	15.0	15.0	15.5
No. of Words Retained	15.0	15.0	14.5

TABLE 22

PRIMARY DEAF - COMPARISON OF MEDIAN SCORES BETWEEN GOOD AND POOR SPEECHREADERS

Groups	Good[1] (N=13)	Poor[2] (N=6)
Chronological Age	7yrs.-11mos.	7yrs.-7mos.
Teachers' Ratings of Speech	Good	Fair
WISC Performance IQ	104.0	97.0
Standard Score Goodenough-Harris Drawing of Man	100.0	84.5
Grade Scores - Gates Reading Tests		
Word Recognition	2.50	1.70
Paragraph Meaning	2.25	1.45
Picture Story Language Test		
Syntax	67.0	63.0
Words Per Sentence	5.25	3.0
Abstract/Concrete	7.0	1.0
No. of Words Known on Speechreading Pre-test	9.0	5.0
No. of Words Known on Final Speechreading Test	16.0	9.0
No. of Words Retained	15.0	8.5

1. Includes those classified as Excellent
2. Includes those classified as Fair and Average

TABLE 23

COMPARISON OF MEDIAN SCORES AMONG EXPERIMENTAL GROUPS-
PRIMARY HARD OF HEARING

Experimental Groups	I(N=2)	II(N=2)	III(N=1)
Chronological Age	8yrs.-6mos.	8yrs.	7yrs.-9mos.
Teachers' Ratings of Speechreading	Good	Excellent	Good
WISC Performance IQ	114.0	110.5	87.0
Standard Score Goodenough-Harris Drawing Of Man	115.0	97.0	148.0
Grade Scores - Gates Reading Tests			
Word Recognition	2.7	2.88	1.65
Paragraph Meaning	2.45	2.45	2.27
Picture Story Language Test			
Syntax	77.0	48.0	-
Words Per Sentence	5.1	3.0	-
Abstract/Concrete	4.0	4.5	-
No. of Words Known on Speechreading Pre-test	14.0	10.0	14.0
No. of Words Known on Final Speechreading Test	17.0	17.0	17.0
No. of Words Retained	16.5	16.0	16.0

compared on the basis of speechreading skill the good lipreaders had learned a median of seven words more than those classified as poor, (See Table 22). However, this difference was not statistically significant. Inasmuch as some of those classified as good speechreaders had scores which were poorer than those of the Poor lipreaders, the two groups were reconstituted based on the scores obtained in the speechreading procedures. This was accomplished by transferring two subjects from each group. The good speechreaders had learned sixteen words and the poorer 8.5. Although the difference was fairly large, it was not statistically significant.

The Intermediate Group

For the oldest group no discernable pattern was exhibited. Nineteen words were taught to the experimental groups. For the Deaf, experimental Group III learned more words, but on the pre-test they had started with less. There were no statistically significant differences among the three experimental groups for any of the variables under consideration, including measures of intellectual functioning, read and written language, the number of words known previous to the experiment, and the number of words learned as a result of the experimental procedures. (Tables 24, 25) For the Hard of Hearing, the task was apparently too easy. Six of the subjects learned the vocabulary in only two sessions, although four had been planned for this age level; five Female Hard of Hearing subjects were not included in the experimental learning procedures as they knew seventeen or more of the vocabulary words on the pre-test. Again no significant differences were observed between good and poor speechreaders among both the Deaf and Hard of Hearing. (Tables 26, 27) However, on the re-test the good speechreaders were able to retain seventeen words, the poor 9.5 (significant at the .05 level, Fisher Exact Probability Test). The data in Table 28 revealed that the type of learning situation did not effect the number of words learned.

DISCUSSION

As no significant differences appeared among the various experimental groups at any of the age levels, one must conclude that the film method does not of itself improve the capacity of a Deaf or Hard of Hearing child to learn a selected speechreading vocabulary. These results were similar to those observed by Stuckless who noted that qualitatively learning was enhanced through a programmed learning approach, although quantitative measurements showed no significant differences between the experimental groups. In the present investigation learning took place regardless of the method employed; those who used the projectors alone did no worse than those who were taught by the teacher or by a combination of both. Based on the actual amount

TABLE 24

COMPARISON OF MEDIAN SCORES AMONG EXPERIMENTAL GROUPS-
INTERMEDIATE DEAF

Experimental Groups	I(N=4)	II(N=5)	III(N=3)
Chronological Age	10yrs.-3mos.	9yrs.-1mo.	9yrs.-5mos.
Teachers' Ratings of Speechreading	Average	Fair	Fair
WISC Performance IQ	98.5	92.0	97.5
Standard Score Goodenough-Harris Drawing of Man	103.0	113.0	105.0
Grade Scores - Gates Reading Tests			
Word Recognition	2.29	2.3	2.35
Paragraph Meaning	2.27	2.35	2.27
Picture Story Language Test			
Syntax	52.0	78.0	43.0
Words Per Sentence	4.8	5.6	4.0
Abstract/Concrete	10.0	8.0	12.0
No. of Words Known on Speechreading Pre-test	11.5	11.0	9.0
No. of Words Known on Final Speechreading Test	12.0	13.0	15.0
No. of Words Retained	11.0	15.0	15.5

TABLE 25

COMPARISON OF MEDIAN SCORES AMONG EXPERIMENTAL GROUPS - INTERMEDIATE HARD OF HEARING

Experimental Groups	I(N=3)	II(N=3)	III(N=4)
Chronological Age	10yrs.-4mos.	9yrs.-6mos.	10yrs.-10mos.
Teachers' Ratings of Speechreading	Fair	Good	Good
WISC Performance IQ	99.0	103.5	106.0
Standard Score Goodenough-Harris Drawing of Man	93.0	119.0	106.5
Grade Scores - Gates Reading Tests			
Word Recognition	2.9	3.1	4.4
Paragraph Meaning	2.33	2.5	3.3
Picture Story Language Test			
Syntax	63.0	83.0	91.0
Words Per Sentence	6.75	6.14	9.2
Abstract/Concrete	11.0	11.0	14.0
No. of Words Known on Speechreading Pre-test	11.0	11.0	11.0
No. of Words Known on Final Speechreading Test	16.0	19.0	18.0
No. of Words Retained	15.0	19.0	17.5

TABLE 26

INTERMEDIATE DEAF - COMPARISON OF MEDIAN SCORES
BETWEEN GOOD AND POOR SPEECHREADERS

Groups	Good[1] (N = 5)	Poor[2] (N=7)
Chronological Age	9yrs.-4mos.	9yrs.-9mos.
Teachers' Ratings of Speech	Good	Poor
WISC Performance IQ	100.0	97.0
Standard Score Goodenough-Harris Drawing of Man	113.0	105.0
Grade Scores - Gates Reading Tests		
Word Recognition	2.8	2.23
Paragraph Meaning	2.35	2.3
Picture Story Language Test		
Syntax	78.0	56.0
Words Per Sentence	5.0	5.29
Abstract/Concrete	12.0	8.0
No. of Words Known on Speechreading Pre-test	13.0	9.0
No. of Words Known on Final Speechreading Test	16.0	13.0
No. of Words Retained	17.0	9.5

1. Includes those classified as Excellent
2. Includes those classified as Fair and Average

TABLE 27

INTERMEDIATE HARD OF HEARING - COMPARISON OF MEDIAN SCORES BETWEEN GOOD AND POOR SPEECHREADERS

Groups	Good[1] (N=6)	Poor[2] (N=4)
Chronological Age	10yrs.-6mos.	10yrs.-5mos.
Teachers' Ratings of Speech	Good	Fair
WISC Performance IQ	106.0	110.5
Standard Score Goodenough-Harris Drawing of Man	117.0	96.0
Grade Scores - Gates Reading Tests		
Word Recognition	4.1	2.6
Paragraph Meaning	3.0	2.3
Picture Story Language Test		
Syntax	91.0	63.0
Words Per Sentence	9.7	5.0
Abstract/Concrete	12.0	10.0
No. of Words Known on Speechreading Pre-test	12.0	11.0
No. of Words Known on Final Speechreading Test	18.0	16.5
No. of Words Retained	18.5	17.5

1. Includes those classified as Excellent
2. Includes those classified as Fair and Average

TABLE 28

COMPARISON OF MEDIAN SPEECHREADING SCORES AMONG EXPERIMENTAL GROUPS FOR THOSE INTERMEDIATE DEAF AND HARD AND HEARING CLASSIFIED AS GOOD SPEECHREADERS

Experimental Groups	I(N=2)	II(N=5)	III(N=4)
No. of Words Known on Speechreading Pre-test	12.5	13.0	12.0
No. of Words Known on Final Speechreading Test	14.5	19.0	18.0
No. of Words Retained	16.5	17.0	17.5

of time devoted to the learning situation, those employing the film only achieved their maximum scores in less time than those employed in the other experimental conditions. Stated more positively, those subjects employing the projector and film without any pedigogical assistance from the teacher learned the required vocabulary as well as any of the other subjects; this accomplishment was especially true for those either rated or observed to be good speechreaders. The poorer speechreader showed little improvement, regardless of the method employed, except at the older age levels (here the problem may have been the inconsistency of the teacher ratings, while at the lower age levels the ratings were more reliable). For the poorer speechreader, even after eight training sessions little improvement was noted in the test scores; for the good speechreaders, a consistent trend towards learning was noted early in the experimental procedures. It could be that more training sessions would have produced a better learning curve for the poorer speechreaders; however, because the end of the school year was approaching, the experiment was curtailed. Yet one wonders whether those classified as poorer speechreaders would have improved even after prolonged exposure to the test vocabulary. A suspicion that they would not is supported by the teachers' reports that even when the test vocabulary had been incorporated into the curriculum of the younger children for as long as a year, these words still were not learned.

It would appear that the film procedure can be successfully employed as an ancillary tool for practice and drill purposes, permitting the teacher to devote more of her attention to the slower pupil.

One of the problems which may have vitiated more significant results was the difficulty in maintaining the attention of the subjects, both in the learning and in testing when the film procedures were involved. For example, in the nursery group, the poorer speechreaders, once the novelty of the films had worn off, paid little attention to the projected material. Since the film's story line required verbal communication between two actors, the teacher and pupil, the situation portrayed was static. It appears that the poorer speechreader could not grasp that the movements of the lips were conveying information; hence, they became bored with the lack of action. On the other hand, those for whom the lips had meaning were distinguished by the intensity of their absorption in the film playlets. The capacity to attend consistently to this type of situation could be considered a clinical expression of how meaningful verbal communication is for the hearing impaired child. The results also suggest that for the child inexperienced in speechreading a much more animated approach to film production would be more successful in attracting and maintaining attention. Cartoon-like films similar to those the child observes on commercial television and the motion picture theaters probably would be more appealing to the hearing impaired child who has not yet established speechreading as his basic

communication tool.

Statistical analyses confirmed previous studies that have demonstrated a lack of significant correlation between general tests of intelligence and speechreading ability. The scores on the WISC, the Goodenough-Harris, and the Nebraska Test of Learning Aptitude did not distinguish between the poor and good speechreaders. Tests of read and written language also failed to reveal any significant differences between these groups. However, the selection criteria for the study, the types of stimuli employed as a measure of speechreading ability, as well as the comparatively small number of subjects all may have contributed to the failure to establish a significant relationship between speechreading and other types of language functioning.

CONCLUSIONS

The study has indicated that programmed filmed techniques can be a useful adjunct to the classroom procedures. However, further experience will be needed to determine the types of films most beneficial for effective learning.

The study has also pointed up the need for further information concerning the speechreading process itself, not only why some are able to develop this ability in a comparatively easy manner, but also to determine why a large number of deaf children, seemingly intact and with normal intellectual functioning, are unable to attain skill in using speechreading for communication. Such an investigation is now being undertaken by the Institute for Language Disorders.

SUMMARY

Educators of the deaf have long been concerned withthe need for the improvement of language abilities of Deaf children. It has been suggested that speechreading, the visual symbolic rendering of the movements of the lips, by becoming the hearing impaired child's receptive language, will enhance the development of all language functioning. By improving his language functioning the deaf child would increase his ability to participate successfully in the hearing world.

It has been observed that one of the needs in the education of the deaf is for improved procedures for practice and drill for the improvement of speechreading ability. If such procedures were available for the deaf child to do work on his own, the classroom teacher could be freed to devote more of her time to the poorer pupil. It was hypothesized that a properly developed speechreading vocabulary if filmed and edited to make use of the

self-winding, cartridge-load, eight millimeter projector could meet the need for such practice materials.

To test this hypothesis a series of films designed to teach a specific vocabulary for four different age levels was produced. These films were then placed in cartridges to be used with the Technicolor 800 and the Fairchild Mark IV Cinephonic self-winding eight millimeter projectors.

The sample employed in the investigation was drawn from the hearing impaired pupils attending a large metropolitan school which contained special classes for the deaf and hard of hearing. In all 89 children were studied which included all those in the age level between four and ten years of age who met the criteria established for inclusion in the investigation. At each age level the subjects were divided into three experimental groups: Group I was taught the vocabulary through use of the films and projectors only; Group II was taught by a teacher from the school's regular faculty and then permitted to use the films for practice; Group III was taught by the same teacher but did not see the films. Each of the groups was equated by age, sex, socio-economic status, hearing levels, intelligence, language functioning and communication skills.

It was hypothesized that hearing impaired children would learn a selected speechreading vocabulary more readily when such a vocabulary was presented through a programmed approach employing the cartridge-load, self-winding, eight millimeter projector. The results of the study did not support this hypothesis; it was discovered that those children who were able to learn the vocabulary did so regardless of the teaching method employed. It was noted however, that those children who used the film method only, although they learned the vocabulary in the same number of experimental sessions tended to require less time. The results suggest that hearing impaired children can be taught a speechreading vocabulary through the use of motion picture film and the cartridge-load projector and that such a procedure can be a useful adjunct to the curriculum for developing communication skills. Such procedures could fill the need for practice drill materials for independent use by an individual child or small group and thus free the teacher to devote more personal attention to those who need it.

The study also confirmed previous investigations which have indicated that speechreading skills are not related to overall intelligence. It was also concluded that further investigation is needed of the processes that are involved in the failure of some deaf children to develop speechreading ability so that better educational procedures may be devised for the poorer lipreaders.

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APPENDIX I

Words Taught at Each Level

Nursery — Level I

boy	girl	father	he
fall	jump	march	
mother	baby	she	
walk	throw	take off	

Kindergarten — Level II

fish	knife	turtle	bird
open	slow	taste	spoon
on	cow	fast	
push	fork	wash	
plate	again	elephant	

Primary — Level III

breakfast	help	man	picture
there	her	bus	chair
my	all	woman	
him	dining room	bathroom	
down	also	hold	

Intermediate — Level IV

window	try	name	sad
clean	together	happy	hair
read	story	lamp	sleep
something	glass	beautiful	his
bring	over	outside	